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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,587	04/26/2001	Aly A. Farag	1160.012US1	7712

21186 7590 11/07/2003

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EXAMINER

VO, CLIFF N

ART UNIT PAPER NUMBER

2671

DATE MAILED: 11/07/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/842,587

Applicant(s)

FARAG ET AL.

Examiner

CLIFF N VO

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14, 15 and 21-26 is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-10 and 16-19 is/are rejected.
- 7) ☒ Claim(s) 5-7, 11-13 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Objections


1. Claim 1 is objected to because of the following informalities: the term "t he" (line 5) should be changed to --the--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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3. Claims ^{1, 2, 8, 17}~~1-4, 8-10~~ and ~~16~~ 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yamany et al, "3D Reconstruction of the Human Jaw From A Sequence of Images".

As per independent claim 1, Yamany et al teach a computerized method and system for dental imaging comprising a step of receiving a plurality of two-dimensional images of an oral cavity, generating at least one three dimensional image of real image of the oral cavity from the plurality of two dimensional images (page 1, col.2, lines 1-5) including a step of generating shape-from-shading data (page 1, col.2, lines 1-10) and range data (page 2, col.1, lines 16-38, i.e., "depth data") using

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the plurality of two dimensional images and a step of processing the SFS data and the range data to generate at least one three dimensional image (page 1, col.2, lines 11-14).

As per claim 2, Yamany et al further teach wherein the plurality of two dimensional images comprising a plurality of two dimensional optical images (page 1, col.2, lines 24-31).

As per independent claim 8, Yamany et al further inherently teaches a computer readable medium having computer executable instructions in order to cause the computer system to perform the steps as set forth in claim 1.

Claim 17 is similar to claim 1, Yamany et al further teach a digitizer providing five degrees of freedom, having an arm (Fig.2, page 3, col.2, lines 20-23), a camera rigidly mounted on the arm of arm of the digitizer (Fig.2).

As per dependent claim 19, Yamany et al further teach a display coupled to the computer system, receiving the three dimensional model and generating an image of the three dimensional model (Fig.2, page 1, col.2, lines 1-20).

4. Claim 16 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yamany et al, "A System for Human Jaw Modeling Using Intra-Oral Images".

As per independent claim 16, Yamany et al teach a method and system for generating a three dimensional images from a plurality of two dimensional images (page 1, col.2, lines 17-26) comprising a step of generating a three dimensional image of a human jaw including generating SFS data that is

generated from a direction of an illuminant of the jaw that is estimated in reference to camera intrinsic parameters (page 2, col.2, lines 2-13; page 3, col.1, lines 22-44).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamany et al, "3D Reconstruction of the Human Jaw From A Sequence of Images" in view of Rider et al (U.S. Patent No. 6,192,329).

As per claims 3, 9 and 18, Yamany et al fail to implicitly teach a step of constructing a physical cast of the oral cavity from the three dimensional image. However, Rider et al teach another computer system including a step of forming a physical model of the oral cavity from the three dimensional image (col.1, line 63 through col.2, line 9). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the step of forming physical cast of the oral cavity as described in Rider et al into Yamany et al system in order to make it more efficient because it would have allowed the user to demonstrate the model more clearly which is

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difficult to communicate with the virtual three dimensional computer representation as suggested by Rider et al at col.8, lines 37-40.

7. Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamany et al, "3D Reconstruction of the Human Jaw From A Sequence of Images" in view of Yamany et al, "A System for Human Jaw Modeling Using Intra-Oral Images".

As per dependent claims 4 and 10, Yamany et al fail to teach a step of generating a plurality of 2D images of the oral cavity from a common reference point in three dimensional space. However, Yamany et al disclose in another system including the above step at page 3, lines 33-40. It would have been obvious to one of ordinary skill in the art at the time the invention was made to configure Yamany et al system including the step of generating 2D images from a common reference point in three dimensional space because it would have greatly enhanced the time required for registration as suggested by Yamany et al at page 3, lines 47-48.

Allowable Subject Matter

8. Claims 14-15 and 21-26 are allowed.

9. Claims 5-7, 11-13 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cliff N. Vo whose telephone number is (703) 305-9594. He can normally be reached Monday-Friday and alternate Monday from 8:00am-5:30pm.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798. The fax phone number for this Group is (703) 305-9724.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

9/16/2003



CLIFF N. VO
MARY EXAMINER